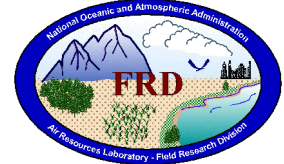


FRD Activities Report February 2003



Research Programs

CLAST-Low

Analysis of LongEZ data from the CBLAST Pilot Study (Summer, 2001) was presented at the annual CBLAST workshop in Miami in mid-February. This analysis, conducted by Tami Grimmett, investigated transfer coefficients, as determined from the LongEZ measurements, and how they relate to sea-state. These very preliminary results illustrate the utility of the LongEZ data and the tremendous potential for continued analysis. Since the departure of Jerry Crescenti, Jeff French met with Simon Chang (ONR Program manager) to discuss FRD's continued involvement in CBLAST-Low. An official funding request was submitted to ONR on February 26. If approved, FRD will be funded for an additional two years to continue the analysis of data collected during the Pilot Study, including the investigation of transfer coefficients and sea-state, SAR, aircraft and buoy calculated wind vectors, temperatures from the Fast, Ultra-Sensitive Temperature (FUST) Probe, and further support and routine processing of the data for outside users. (Jeff.French@noaa.gov, Tami Grimmett)

CLAST-High

The annual CBLAST workshop was held in Miami and hosted by the Rosentiel School of Marine and Atmospheric Science (RSMAS) at the University of Miami in mid-February. Investigators from all aspects of CBLAST-Hurricane participated. This included not only those with equipment on the NOAA P3's but also groups from Scripps and University of Washington who will attempt to deploy profiling floats in advance of hurricanes this upcoming season. Discussion focused on the lessons learned from last year's "Pilot" experiment and what needs to be done to ensure success in this year's deployment.

Although we are still waiting for the high frequency INS data from the P3 flights last summer, we did present some partially processed data from the BAT probe on the P3 that indicated it does indeed provide the high fidelity measurements of aircraft flow angles. Figure 1 shows calculated angle of attack and subsequent power spectra for a low-level 'flux' leg at 100 m altitude from a flight on August 23. This figure shows that indeed the flow angle as determined from the pressure measurements respond throughout the entire frequency range and there is no apparent dampening due to water in lines or the back-flush plumbing (used to prevent water build-up in the lines). The spike around 15 Hz is a result of vibration; this is the natural frequency of the probe arm with the BAT mounted.

CBLAST-Hurricane has roughly 100 hours on the P3 for the upcoming field campaign. It was

determined that we will likely focus on two storms, the first a likely Category II-type storm where we can further test and refine the flight strategies of making low-level penetrations after an initial survey pattern. For the second storm, we will attempt to make measurements over the course of two to three days in a category IV storm. The 'stepped-descent' flux legs will be attempted in three quadrants of the storm to investigate the influences of sea-state on boundary layer fluxes. (Jeff.French@noaa.gov)

Joint URBAN 2003

Studies were conducted on Automated Tracer Gas Analysis System (ATGAS) #2 to determine what concentration levels cause carry-over into the lower concentrations and how large this carry-over is. The highest calibration standard of 208,500 ppt was used as a starting point since this would most likely be the worst-case-scenario. The 208,500 ppt standard was analyzed followed by low level standards. The low level standards were varied to provide information about the amount of carryover. The 1.97 ppt standard had an average recovery of 319%, the 3.47 ppt standard had an average recovery of 211%, the 8.28 ppt standard had an average recovery of 168%, the 20 ppt standard had an average recovery of 124% and the 36.6 ppt standard had an average recovery of 116%. Obviously, the between-cartridge cleaning protocol must be adjusted to accommodate any incidences of high level analysis followed by a low level analysis. More studies will be performed using a lower level standard and different ATGAS. Each ATGAS must be tested to determine the appropriate cleaning protocol for its specific needs. (Debbie@noaa.inel.gov)

An SF₆ retention study on new sampler tubing was done on ATGAS #1. The silicon tubing used for the new samplers was put onto the ATGAS in place of the rubber tubing that has

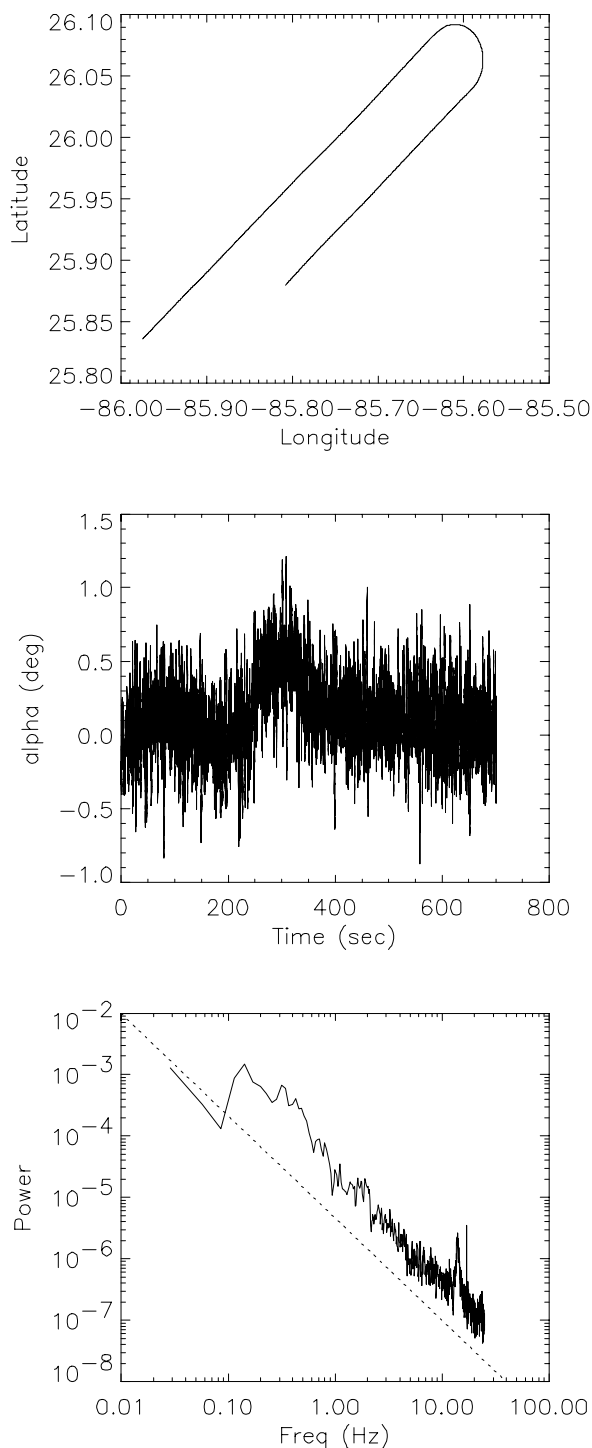


Figure 1: Angle of attack calculations from the BAT Probe on the P3 for the race track shown in the top graph. The altitude is ~100m. The bottom graph shows power spectra revealing no contamination from rain or backflushing.

been used in the past. The silicon tubing caused a recovery of 3173% when the 1.97 ppt standard was analyzed following the 208,500 ppt standard. The 1.97 ppt standard was analyzed a second time with a recovery of 205%. The analysis of the 1.97 ppt standard using the rubber tubing caused a recovery a 490%, with a second analysis showing a recovery of 152% and a third analysis of 130%. These results mimic the results of the tubing study done earlier for the samplers. The silicon tubing seemed to release most of the high concentration contamination quickly, while the surgical tubing seems to release low levels of the high concentration over longer periods. Therefore, the silicon tubing is best for the samplers since a high level standard should be completely cleaned from the silicon tubing during its purge cycles causing no contamination over time. The surgical tubing is best for the ATGAS since it doesn't release large amounts of high level contamination at one time. Instead, it releases low levels of contamination that can be compensated for by an established cleaning protocol. (Debbie@noaa.inel.gov)

Three calibration gases were sent back to Scott-Marrin, the manufacturer, for re-certification. Scott-Marrin recommends that calibration gases be re-certified every 2 years if they are at the ppt or ppb level, and every 3 years if they are at the ppm level. These recommendations are based on Environmental Protection Agency (EPA) requirements as well as the manufacturer's experience. The gases chosen to be re-certified were the 3.47 ppt standard that was last analyzed in 1996, the 292.9 ppt standard last analyzed in 1992 and the 18.6 ppb standard last analyzed in 1988. Upon receipt of these results, we will examine the other standard concentrations as well as the length of time since their last analysis and determine if any more calibration standards need to be re-certified. (Debbie@noaa.inel.gov, Roger@noaa.inel.gov)

Work continues on development of appropriate calibration curves for the ATGAS to cover the extended range needed for Joint URBAN 2003. The concentration range needed is from approximately 2ppt - 200,000 ppt. The ECD's used in the ATGAS are only linear over an extremely small range. Due to the non-linear nature of the ECD's, interpolation between two calibration points has been used in the past. Unfortunately, calibrating in this fashion creates 12 different calibration curves, all of which need to be verified. The verification process can be very time-consuming. New calibration equations are being developed that would reduce the number of curves and therefore, reduce the need for extensive verification. Since each ECD and ATGAS behaves differently, the different methods will need to be tested on each ATGAS and the best equations will be chosen to fit all ATGAS. (Debbie@noaa.inel.gov, Roger@noaa.inel.gov)

Software development for the new programmable integrating gas sampler (PIGS) is proceeding in parallel with the hardware development. The new sampler will allow variable bag timing, delays between bags, and an improved record keeping system. The new samplers are being developed for the Joint Urban 2003 study. (Roger.Carter@noaa.gov)

A production prototype of the sampler enclosure and cartridge mechanism was manufactured and tested. Several minor changes will be needed to ensure ease of construction, ease of operation, and total interchangeability of all samplers between all cartridges. One or two more production prototypes will be fabricated and should allow all changes to be made and tested prior to manufacturing all 65 samplers and 325 cartridges. (Randy.Johnson@noaa.gov)

ET Probe

Talks were held in February with ATDD on getting the ET probe project back into high gear. The main stumbling block has been that ONR, which provides most of the funding, has not yet allocated the FY 2003 funding for the project. ONR has indicated that the funding is on its way, but nearly half of the fiscal year has already passed. We are now faced with having to perform the work on a highly compressed schedule, and during a part of the year when major field experiments (e.g., Oklahoma City) are competing for staff time. At FRD, the main tasks this spring will be to improve the ET probe software and to perform intercomparisons of the ET probe data with the sonic anemometer located at INEEL. These comparisons will include turbulence statistics and fluxes in addition to mean winds and temperature. (Richard.Eckman@noaa.gov and Tom Strong, FRD; Ron Dobosy and Dave Auble, ATDD)

SERA Aircraft

A budget was submitted to ARL management and subsequently to OAR management for the acquisition of a Velocity aircraft to replace the LongEZ. Additional funds were requested to purchase instrumentation lost in last summer's crash of the LongEZ. Total funds requested were in neighborhood of \$450 thousand. The aircraft and avionics accounts for a little over half of that total, while the instrumentation amounts to roughly \$150 thousand. The remainder of the funds are required for the purchase, installation and associated engineering costs for a Ballistic Recovery Parachute. The parachute, similar to the one flown on the LongEZ is a critical piece of safety gear given the conditions in which the Velocity is expected to be flown. (Jeff.French@noaa.gov)

Rain In Cumulus over the Ocean (RICO)

There has been ongoing discussion between Jeff French and Bart Geerts (Univ. Wyoming), Charlie Knight (NCAR) and Bob Rauber (Univ. Illinois) focusing on what platform is most suitable for the use of the Wyoming Cloud Radar (WCR) during RICO. The Science Overview Document (SOD), submitted for review to NSF in January, suggests the WCR would be mounted on the NCAR C-130. Geerts and French, however, argue that the Wyoming King Air would provide a better platform to meet the objectives of RICO as outlined in the SOD. The King Air will be used to investigate cloud processes (micro-physics) and cloud interaction (dynamics) in maritime cumulus clouds. A conference call is set for early March to make a final decision regarding the use of the WCR in RICO. (Jeff.French@noaa.gov)

Cooperative Research with INEEL

Emergency Operations Center (EOC)

Brad Reese and Jeff French participated in an EOC activation exercise on February 12. The scenario involved the Advanced Test Reactor at TRA. The drill used the new hazard assessment for the reactor containment building, which assumes a release of material over a 48-hour time

period. There was some confusion regarding what scenarios (from MDIFF) were being displayed in the Control Room. Steps have been taken to alleviate this problem in future activations. (Jeff.French@noaa.gov and Brad Reese)

INEEL Support

The report entitled “A Statistical Investigation of Atmospheric Dispersion at the Idaho National Engineering and Environmental Laboratory (INEEL)” has completed the review process and has been published as NOAA Technical Memorandum OAR ARL-246. It describes a study of worst-case dispersion at INEEL based on nine years of Mesonet data. A PDF version of the report is available at <http://www.noaa.inel.gov/personnel/Eckman/>. (Richard.Eckman@noaa.gov)

An annual refresher course on INELVIZ and MDIFF Transport Modeling was provided to 9 INEEL EOC personnel. (brad@noaa.inel.gov)

At the request of INEEL Emergency Planning, we have provided artificial meteorological data sets for emergency operations drills on Feb. 12, 2003 and Mar. 5, 2003. The artificial meteorological data will be displayed on the exercise participants' computer screens exactly as real data is, allowing the exercise participants to see and react to a simulated release exactly as they would in an actual situation. Artificial data is used so that the release consequences will follow the scenario designed for the drill. (Roger.Carter@noaa.gov)

INEEL Mesoscale Modeling

Version 3-6 of the MM5 model was installed on a FRD Linux server for testing. This version of the model has a new land surface parameterization that includes more cold-season effects. Initial tests of the new version resulted in some problems. It seems to run about 50% slower than version 3-5, and it tends to lock up after a few hours of simulated time. However, the FORTRAN compiler used to build MM5 was upgraded at the same time as the model, so the problems may stem from the compiler and not the MM5 source code. Further tests will be performed in March to determine the source of the problems. (Richard.Eckman@noaa.gov)

As discussed in previous months, FRD has been testing a new configuration of MM5 that is mostly initialized from the 12 km Eta model output now available from NCEP. The old configuration is initialized from 40 km Eta grids. The hope was that the higher resolution NCEP output would improve the initialization of such things as snow cover and soil moisture. This hope was often not borne out in February. The high resolution snow cover still does not seem to be very accurate in Southeast Idaho. This winter has been unusually warm in the Intermountain West, and the snow cover has been light or nonexistent in much of the Snake River Plain. In spite of this, the NCEP products have consistently placed large areas of snow in the Plain. This has frequently caused havoc with the MM5 forecast temperatures. (Richard.Eckman@noaa.gov)

Other Activities

NAERS

The Network of Airborne Environmental Research Scientists will hold its 2nd annual meeting in Trento, Italy in October 2003. NAERS, which began as a vision of Tim Crawford and Jorg Hacker (Airborne Research Australia), held its inaugural meeting in Idaho Falls in January 2002. It consists of a loose organization of scientists from around the world dedicated to investigating complicated environmental problems using small research aircraft. The inaugural meeting included over 25 scientists from 10 institutions on 4 continents. The second meeting is expected to draw an even larger contingent, including scientists from EUFAR (European Fleet of Aircraft for Research) small aircraft group. The NAERS group is seen as critical to the success of the ARL SERA program as a way for scientists from around the world to discuss issues unique to the small research aircraft community. (Jeff.French@noaa.gov)

DMCC Meeting

The quasi-annual meeting of the DOE Meteorological Coordinating Council (DMCC) was held on 12 February, in Long Beach, CA, in conjunction with the annual AMS meeting. Kirk Clawson gave an invited presentation on IMS development at FRD. (Kirk.Clawson@noaa.gov)

Invited Seminar Presentation

At the invitation of the Plant and Animal Science department chairman at Brigham Young University, Kirk Clawson presented a seminar entitled “An Agriculture/Horticulture Degree: A Doorway of Opportunity.” He discussed how different disciplines are used in NOAA and how a graduate can parley his/her degree into working for NOAA. He also discussed the URBAN 2000 tracer study in Salt Lake City, UT, and the upcoming Joint URBAN 2003 study to be conducted this coming summer in Oklahoma City, OK. Several students expressed interest in working at FRD in Oklahoma City this summer and talks are underway to form internships that will benefit both the students and FRD. (Kirk.Clawson@noaa.gov)

Safety

The NOAA safety video, “Office Ergonomics” was shown at the monthly staff meeting. (Debbie@noaa.inel.gov)

Vera Bolton from the INEEL, conducted ergonomics training on February 26th. She showed an ergonomics video and then showed the group some ergonomic equipment such as gloves, keyboards, wrist rests, etc. She conducted one-on-one evaluations of each person’s workstation from the 26th-28th. She introduced some “quick fixes” while she was here as well as some advice on workstation improvements. She will provide a detailed report of equipment needs as well as written advice on each person’s workstation improvements. (Debbie@noaa.inel.gov)

Mark George, the Environmental Compliance Officer from MASC, sent the “Draft Assistance Visit Report”. This safety visit was conducted in July of 2002 by Mark George and Rhonda Carpenter. Several items for improvement were listed. Comments on the report are needed by March 14th. (Debbie@noaa.inel.gov)

An internal facility safety audit was conducted on February 17th. Results of this audit will be combined with the results from the Assistance Visit Report to produce a detailed listing of safety issues to be addressed. Some issues have already been addressed, while others will be discussed at the next staff meeting. (Debbie@noaa.inel.gov)

Personnel

Jerry Crescenti has decided to move to leave the government in favor of the private sector. His new employer is Florida Power and Light. After a fond farewell party by the FRD Employees Association, Jerry bid us goodbye on February 25.

Papers

Eckman, R. M., 2003: A Statistical Investigation of Atmospheric Dispersion at the Idaho National Engineering and Environmental Laboratory (INEEL). NOAA Technical Memorandum OAR ARL-246, 36 pp.

Travel

Jeff French attended a workshop in Miami February 18-21 for ONR sponsored CBLAST programs. Discussions revolved around the upcoming field campaign for CBLAST-Hurricane and the ongoing data analysis for CBLAST-Low.

Kirk Clawson, Jerry Crescenti, and Tami Grimmerett attended the annual AMS meeting in Long Beach, CA, Feb. 10-13. Kirk Clawson also attended the annual meeting of the DOE Meteorological Coordinating Council (DMCC) in Long Beach, CA, Feb. 12.

Kirk Clawson traveled to Provo, UT, to present an invited seminar at Brigham Young University on February 28.

Visitors

David McGinnis, professor of geological sciences at Idaho State University visited FRD to confer on a joint NSF proposal to develop a mesonet in Yellowstone National Park.